DOCUMENT RESUME

ED 047 325 CG 006 188

AUTHOR Steele, Joe Milan; And Others
TITLE Assessing Instructional Climate: Development of the Class Activities Questionnaire; Patterns of Cognitive and Affective Emphasis in Gifted and Average Classes.
INSTITUTION Illinois Univ., Urbana. Center for Instructional Research and Curriculum Evaluation.
PUB DATE 7 Feb 71
NOTE 35p.; Paper presented at the American Educational Research Association in New York, New York, February 4-7. 1971

EDRS PRICE EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS Affective Behavior, *Classroom Environment, *Gifted, *Measurement Instruments, Student Opinion, *Thought Processes

ABSTRACT

As part of a large scale evaluation of the state gifted program in Illinois, the systematic collection and processing of low inference student judgments about their classes was used to describe and evaluate classroom transactions. Profiles of 62 gifted classes were compared to 69 average classes on the Class Activity Questionnaire. This questionnaire consists of paired items comprising seven cognitive factors based on Bloom's Taxonomy and nine affective factors (such as discussion opportunity, test/grade stress) which yield a profile in instructional climate. Four subscores show emphasis on Lower Thought Processes, Higher Thought Processes, Classroom Focus, and Classroom Climate. It was found that gifted classes were superior in emphasizing higher thought processes, classroom focus, and classroom climate but not lower thought processes. In addition, factor analysis suggested two distinct patterns of student learning - one active and one passive. The implications for assessing instructional climate in this way include avenues for research on effective teaching, evaluation and comparison of existing programs, and teacher training possibilities. (Author/RSM)

ED047325

ASSESSING INSTRUCTIONAL CLIMATE:

DEVELOPMENT OF THE CLASS ACTIVITIES QUESTIONNAIRE

By

Joe Milan Steele
Ernest R. House
Stephen D. Lapan
Thomas Kerins

Illinois Gifted Program Evaluation
Center for Instructional Research and Curriculum Evaluation
University of Illinois
805 West Pennsylvania
Urbana, Illinois 61801

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A paper for presentation to the

American Educational Research Association

New York, New York

February 7, 1971

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ASSESSING INSTRUCTIONAL CLIMATE:
DEVELOPMENT OF THE CLASS ACTIVITIES QUESTIONNAIRE [1]

INTRODUCTION

Instructional climate is an aspect of environmental press defined by the characteristic demands of the classroom environment as perceived by the students to whom they are directed. The concept of environmental press was described in 1938 by Henry Murray. From the characteristic modes of response of individuals are inferred needs whose strength and relationships characterize the personality. In a similar way the strengths and relationships of characteristic stresses, pressures, rewards, and other influences of the environment compose the environmental press.

In 1956 Stern, Stein, and Bloom elaborated the environmental press concept by applying it to assessment studies and showing that an improvement in the prediction of performance was possible by defining the psychological demands of the situation in which the performance takes place. The College Characteristics Index developed in 1957 by Pace and Stern applied the concept of environmental press to college atmospheres. More recently Sinclair developed the Elementary School Environment Survey for identifying various aspects of environmental press in

elementary schools. Walberg and Anderson (1968) have shown that measures of student perception of classroom environment predict gains in cognitive, affective, and behavioral learning criteria, even after differences in achievement, interest in the subject, and IQ are extracted.

At this point the literature merges with another series of studies concerning the teacher's effect on classroom climate. Walberg (1969) has shown that the teacher's personality and attitudes influence the climate of the classroom. More specifically, Gallagher (1963) has pointed out the "crucial role played by the teacher as the initiator and determiner of the kinds of thought processes expressed in the classroom."[2]

It is recognized that the individual's perception of the environment is in part a response to external press and in part affected by internal needs. Thus one way of treating student responses would be to study the personal characteristics of respondents and identify students with deviant perceptions for counseling and differentiated treatment. Alternately, the perceptions of the majority of students could be studied with attention focused on the environmental demands and their manipulation to produce optimal learning by most students. Anderson, Walberg and Welch (1969) have shown the feasibility of changing classroom environments.

As Stern (1970) points out, there may be some disparity between the perceived situation and the veridical one; however, for the students themselves the perception is the reality. The relative influence of the teacher and the students on the instructional climate of the class remains an unsolved problem. However, if social behavior, goals, attitudes, and interests are in large measure acquired through environmental conditioning, it would seem reasonable to identify the environmental press and

structure the situation to be more congruent with the purposes of the school. This approach is the one taken in the development of the Class Activities Questionnaire.

THE PROBLEM

This study occurred as part of a large-scale evaluation of the state gifted program in Illinois. As this is a large and comprehensive program, the variety of different projects developed in local school districts is very great indeed. What was needed was a means of assessing educationally meaningful dimensions of instructional climate. The search for common denominators that reduce instructional programs to the same--or at least comparable--terms led to the identification of two promising domains:

1) The Cognitive Domain--the levels of thinking called for in class activities;
2) The Affective Domain--the social and emotional conditions that exist in the classroom.

One of the most strongly supported systems for classification of cognitive operations is that developed by Bloom and his colleagues (1956). While the goals and content of programs are diverse, only a limited number of thinking operations are believed to exist. These are implied in the class activities students are called upon to perform. By identifying general categories of activities emphasized in a particular class, one can infer the cognitive processes stressed in that class.

Another domain which allows comparisons of diverse programs is an assessment of the social and emotional conditions that exist in the

classroom. Some of these are process factors--the way the group and teacher interact and work together, teaching strategies, the norms and roles that become defined for all participants. Other factors have to do with individual and group attitudes and feelings: trust and cooperation, warmth and enthusiasm, acceptance and involvement. Still other factors have to do with what goals are espoused and how they are perceived--what the students and teacher think the class is for, including the stresses and pressures exerted by school, home, and peers.

The decision was made to look at classroom transactions in these two domains to see what mental and emotional demands were being made upon students. One problem to resolve was how to gather data from actual classrooms. The data collection procedure needed to be accurate in describing class instruction over time, yet efficient and economically feasible. It was judged that the most accurate estimate of cognitive emphasis and positive learning environment could be obtained using sensitive and perceptive observers who would be in the class frequently and who were trained in using systematic procedures to collect the data. This procedure is too costly. The training, time, and support demands prohibit its use. (Not to mention the difficulty of locating qualified personnel willing to do this somewhat unrewarding job.) However, two sources of untrained observers exist in any classroom: the teacher and the students. Some evidence (Ehman 1970, Remmers 1963) indicates that students' observations provide an accurate picture of the classroom environment. The decision was made to process student observations of classroom characteristics, a much more objective form of data than self-report information.

METHOD

Description of the Instrument

The Class Activities Questionnaire (CAQ) is a 25 item instrument administered to both students and teacher.[3] It asks students to agree or disagree on a four point scale to statements describing general kinds of activities which characterize their class. These activities imply either levels of thinking or affective classroom conditions. Each item is paired with another item to compose a factor; sixteen factors yield a revealing profile of the class. (Five factors are represented by single items. One factor, "Teacher Talk" is reported separately as well as being used as a component of the "Lecture" factor.) In addition, subscores are derived by clustering factors into the four dimensions of Lower Thought Processes, Higher Thought Processes, Classroom Focus, and Classroom Climate. The cognitive dimensions of Lower and Higher Thought Processes represent a dichotomy strongly supported in validation studies of Bloom's Taxonomy. The Classroom Focus dimension assesses whether the focus is on the teacher as information-giver with students having a passive role, or on the students being given an active role in the class. The Classroom Climate dimension assesses attitudes and feelings, such as how relaxed and open the class is and the amount of involvement of students in class activities.

Extensive field testing was used in developing the 25 CAQ items. Interviews with students were conducted and revisions made to ascertain that words used were understood and statements appropriately interpreted.

TABLE 1

Structure of the Class Activities Questionnaire (CAQ)[a]

DIMENSIONS	FACTORS	BRIEF DESCRIPTIONS (Items not shown)	r
LOWER THOUGHT PROCESSES (r = .76)	1. Memory:	Activities calling for recall or recognition of information presented.	.88
	2. Translation:	Activities calling for paraphrasing or expressing information in a different symbolic form.	.65
	3. Interpretation:	Activities calling for recognition of relationships and seeing implications of information.	.86
HIGHER THOUGHT PROCESSES (r = .85)	4. Application:	Activities calling for selection of appropriate methods and performance of operations required by problem situations.	.83
	5. Analysis:	Activities calling for recognition of the structure of material, including the conditions that affect the way it fits together.	.78
	6. Synthesis:	Activities calling for the generation of new ideas and solutions.	.89
	7. Evaluation:	Activities calling for development and application of a set of standards for judging worth.	.71
CLASSROOM FOCUS (r = .88)	8. Discussions:	Student opportunity for and involvement in class discussion.	.58
	9. Test/Grade Stress:	High pressure to produce teacher-selected answers for a grade.	.89
	10. Lecture:	Teacher role is information-giver with a passive, listening role for students.	.82
CLASSROOM CLIMATE (r = .86)	11. Enthusiasm:	Student excitement and involvement in class activities.	.91
	12. Independence:	Tolerance for and encouragement of student initiative.	.85
	13. Divergence:	Tolerance for and encouragement of many solutions to problems.	.70
	14. Humor:	Allowance for joking and laughter in the classroom.	.86
	15. Teacher Talk:	Proportion of class time consumed by teacher talk.	.94
	16. Homework:	Weekly amount of outside preparation for class.	.87

[a]The CAQ assesses four major Dimensions of instructional climate, as noted in the left-hand column. Each of these dimensions is composed of a number of Factors which in turn are usually represented by several items in the questionnaire. (The Cognitive Dimensions are based on Bloom's Taxonomy.)

Grade six was determined to be the lowest grade level at which students could understand the items and make the judgments called for. Children below grade six tended to respond globally, the personality of the teacher overriding discriminations of various aspects of the class. In addition to field testing with children, the cognitive items were classified by judges familiar with Bloom's taxonomy to determine whether the items were seen as appropriate for the intended taxonomic categories.

Some evidence of the accuracy of student observations can be seen in responses to the item, "On the average, the teacher talks how much of the time: 90%, 75%, 60%, 40%, 25%, 10%?" A study was conducted of 32 classes comparing the teachers' and median students' estimates to the actual percentage of teacher talk recorded by an observer using Flanders' system of classifying verbal interaction.[4] The median student estimate was within 5% of the actual talk in almost one-third (30%) of the cases and within 10% of the actual talk in 58% of the cases. In contrast to this, no teacher estimates were within 5% of the actual amount of talk and only 16% of the teachers' estimates fell within 10% of the actual talk. A look at discrepancies of over 20% between estimates and actual talk is also revealing. Only about one-fifth (21%) of the median student estimates were off to this extent with students tending to overestimate, but in the same general direction on the scale. Nearly three-fifths (59%) of the teachers erred by more than 20% and most greatly underestimated --in the opposite direction. For example, in a case where the recorded teacher talk was 73%, the teacher estimated 25% and in this case the median student estimate was 75%. This simply demonstrates again a known fact: it is more difficult to be objective in observing oneself than in

observing the activities of others.

The teacher would be a poor source from which to obtain information about the actual emphases occurring in the classroom. However, the teacher is the most direct source from which to obtain data on what is intended to be emphasized. It is for this purpose that the teacher is asked to respond to the CAQ. The teacher reports his intended emphasis and also predicts what the students as a group will say. The teacher can then compare these responses with the actual emphasis perceived by students.

Students are in a much better position to report on the emphasis actually given to various class activities. Moreover, the nature of the instructional climate depends in part on the way it is perceived by the students themselves. Not every student is an accurate observer, however, it is the consensus of student judgments that is of concern. A system of consensus scoring is utilized rather than using simple mean or median scores (except for two estimates: teacher talk and weekly preparation time for class).

Briefly, each of the factors is scored as receiving emphasis in a class only if all of the following conditions are met:

1) Consistency of Response: All Cognitive and Classroom Focus factors on the CAQ are composed of pairs of items describing class activities. If a student agrees with one of the items, and disagrees with the other one, he is inconsistent. Two-thirds of the class must be consistent in their answers to the pair in order to accept that factor for scoring.

2) Direction of Response: If two-thirds of the class show consistency of response, half the class or more must hold the same opinion

about a factor for it to be scored as characteristic of the class.

3) Strength of Response: If a factor is seen as characteristic of the class, it is scored as receiving Some or Much emphasis depending on the strength of response indicated by the mean. A factor is scored as receiving No emphasis if students as a group disagreed with the pair of items. Such a score says in effect that a factor was de-emphasized --it was clearly not characteristic of the class. All factors which do not meet the above criteria are simply scored Inconclusive.

The development and pairing of items and conventions established for administration and scoring were accomplished by repeated field testing, analysis, and revision over a period of months. The instrument was determined to supply meaningful information for grade six and above.

Sample

The sample used for this study consisted of 131 Illinois classes in language arts, science, mathematics and social studies, grades 6 to 12. The 41 male and 52 female teachers included in the sample varied in age, training, and teaching experience. They were assured that their identity would not be disclosed. The 3,138 students responded anonymously during one of their regularly scheduled class periods.

One group of 62 classes were "gifted" classes representative of schools participating in the Illinois Gifted Program. This sample was further divided into 28 "Reimbursement" classes (in districts receiving money from the state to operate gifted programs) and 34 "Demonstration" classes (in districts selected by the state to demonstrate exemplary programs.) The Reimbursement classes were drawn as a 10% random sample of reimbursement districts receiving state funds for more than one year.

The Demonstration sample includes all demonstration classes in grades 6, 7, and 8 in the state.

A group of 69 "Average" classes, grades 6-12 in all four subject areas, were taken as a comparison group with care not to include any below average classes. The sample of Average classes does not purport to be representative of all non-gifted classes in all settings. The Average sample was drawn from three Chicago suburban communities--mainly white, middle-class, socio-economically average or above. A separate study (based on data obtained by Hession, 1969) has shown that gifted and average students do not respond differently to the CAQ.

Reliability

By most methods, reliability is a function of a wide distribution of scores, yet the nature of the CAQ operates to produce a low variance in a distribution of scores within a given classroom group. Reliability coefficients obtained using traditional techniques would be spuriously low. Thus, it is not appropriate to estimate reliability according to the correlational methods ordinarily used for test analysis. It must be remembered that the unit of analysis is the classroom group; that is, certain characteristics of the classroom observed by students. The reliability statistic involved here informs of the stability of the instrument itself--its objectivity as an observational technique. Students are expected to agree about the various characteristics; thus the variance within classes is error variance. As the reliability statistic reflects the ratio of total variance to true variance, if the within class distribution of responses varies more than the distribution of all class means, the reliability of the instrument can be questioned.

In this study (N = 131 classes) the Horst formula (1949) for estimating reliability from the within class and between class variances is used. Winer (1962) treats the same problem and derives essentially the same solution. Table 1 shows these reliability estimates for each of the four major dimensions as well as each of the 16 individual factors of the CAQ. Fourteen of the twenty correlations are above .80 with only one falling below .65.

A second concern regarding the reliability of the instrument has to do with the stability of group responses over time. If the instrument is assessing characteristics of the class that are general enough to be seen as patterns of emphasis over many weeks, then a test-retest reliability coefficient should reflect such stability. This is not to assume that patterns of emphasis are static, but some stability must obtain for an analysis of instructional climate to be meaningful.

A pilot study has been conducted to explore the stability of response over time. Six classes not included in the samples studied in this report were administered the CAQ in late May 1970 and the same form was readministered two weeks later, one week before the end of the school year. Students were not told they would be answering the questionnaire a second time and teachers were not shown the CAQ until the second administration. It was found that the classes included in this pilot study were not typical classes, being quite small and conducted partially in an independent study mode. For this reason, the CAQ was not entirely appropriate as it depends upon a class operating as a group; students may have been responding somewhat arbitrarily to items irrelevant to their situation. The results of this pilot study

are thus considered quite tentative. Table 2 shows the test-retest reliability coefficients for each of the four dimensions of the CAQ.

TABLE 2

Pilot Study Results on the Stability of Class Responses
(Based on test-retest subscore means for six classes. Group sizes ranged from 10 to 18.)

Subscore 1: Lower Thought Processes	Subscore 2: Higher Thought Processes	Subscore 3: Classroom Focus	Subscore 4: Classroom Climate
.67	.91	.59	.89

A more extensive study needs to be made, but these results suggest reasonably stable perception of instructional climate characteristics. Group processing of student judgments appears to be a reliable source of information about the classroom.

Principle Component Analysis

The instrument was developed and used on the basis of a logical design. To ascertain the degree to which the data supported this structure, a principle component analysis of items 1-25 on the CAQ was conducted. Varimax rotation produced ten components accounting for 62% of the variance in the sample studied. (N = 2071; this study was conducted before results were available for some of the average classes. This analysis includes 72 gifted and 16 average classes.) The statistical components provide substantial support for the logical construction of the instrument. Table 3 shows the relationship of the statistical components to the theoretical structure. Eight of the ten logically paired items remained intact in the analysis. The two items in the Evaluation factor

TABLE 3
Relationship of the Statistical Components and
Logical Factors of the CAQ

Statistical Components	Logical Factors and Paired Items (Factor loadings and key words in item shown)
	COGNITIVE FACTORS (1-7)
	1. Memory
Component 2	1. (.53) Remember and recognize
	10. (.73) Memorize
	2. Translation
Component 7	9. (-.80) Restate ideas
	21. (-.45) Explain and summarize
Component 5	21. (.43) Explain and summarize
	3. Interpretation
Component 3	6. (-.71) See implications
	16. (-.80) Find trends and consequences
	4. Application
Component 1	3. (.56) Put methods and ideas to use
	13. (.45) Practice methods to solve problems
	5. Analysis
Component 5	7. (.73) Logical reasoning and analysis
	12. (.72) Think through complicated problems
	6. Synthesis
Component 1	11. (.64) Produce something new
	23. (.71) Invent, design, compose, create
	7. Evaluation
Component 9	2. (.83) Make judgments and explain why
Component 10	20. (.69) Judge the value of ideas
	AFFECTIVE FACTORS (8-16)
	8. Discussion
Component 4	5. (-.78) Actively participate
	15. (.69) Little opportunity to participate (Item reversed)
	9. Test/Grade Stress
Component 2	8. (.64) Know the one best answer
	22. (.64) Great concern for grades
	10. Lecture
Component 8	4. (.93) Do other things than listen in class
	26. (Not incl. in Factor Analysis) Teacher Talk
	11. Enthusiasm
Component 4	19. (-.65) Excitement and involvement
	19. (.43) Excitement and involvement
Component 1	12. Independence
	14. (.57) Independently explore and begin new activities
	13. Divergence
	17. Discover many solutions
	14. Humor
Component 6	25. (.96) Jokes or laughter in class
	15. Teacher Talk
	26. (not included in analysis)
	16. Homework
	27. (not included in analysis)

(Items 18 and 24 were dropped in final stages of field testing, but not deleted from the form of the instrument used in data collection.)

fell out as two independent components. Item 21 in the Translation factor also has a low loading with Analysis. The cognitive domain received strongest support. In relation to the Lower Thought Processes, the classroom focus factor, Test/Grade Stress, is seen to be associated with the cognitive factor, Memory. It has been found that students interpret one of the Memory items as rote memory only. This weakens this factor and results in an underestimate of the degree to which teachers emphasize the recall and recognition aspects of memory.

Of the four higher thought processes, two (Analysis and Evaluation) are shown to be discrete and two (Application and Synthesis) are seen as related. The latter are also associated with the two classroom climate factors, Enthusiasm and Independence. Althought the two items composing the Evaluation factor are seen to be discrete statistical components, they are both relevant for and clearly pertain to evaluation. Therefore, the pairing of these items was retained, although it is clear they are not equivalent in meaning. A search will continue to identify better items to strengthen this structure.

Divergence, one of the four logical factors represented by single items on the questionnaire, did not load on any of the statistical components. This would suggest that it does not assess a discrete characteristic of the class. Little confidence has been placed in the results obtained on this item. It is difficult to believe that tolerance for and encouragement of many answers is a characteristic of most classrooms, as student responses in all groups indicated.

USES AND LIMITATIONS

The Class Activities Questionnaire has been found useful in a large-scale evaluation comparing many classes. This use is illustrated in the

findings of the Illinois Gifted Program Evaluation. Similarly, other special programs or even grade levels or subject areas in a school system could be evaluated.

A second use of the instrument could be as a tool for the teacher to look at his own teaching. Such feedback not only provides some correction or support for the observations of the teacher, but offers a framework within which to modify instruction.

There are cautions to observe in using the instrument. First, the CAQ can be threatening to the teacher. Care should be taken to reduce this threat and to protect the anonymity of both teacher and students. Second, the instrument is not appropriate for use in elementary grades. It may be difficult for some sixth grades and is recommended for use in grades seven and above. Third, the construction and scoring of the instrument is based on group methods of instruction. The CAQ should be used only after a group has stabilized and a pattern of emphasis is apparent to students -- four to six weeks after a course begins.

The Class Activities Questionnaire makes use of a resource readily available but seldom utilized by teachers: the perceptions of students. The perceptions called for are low-inference judgments of prevailing patterns of instructional emphasis. The instrument does not assess all of the variables that should be considered in evaluating instruction. This is not its intent. It does provide a broad picture of classroom transactions. It reveals the perceptual reality of the classroom for students -- a critical element in learning. The implications of assessing instructional climate in this way are extensive.

FOOTNOTES

[1]The work reported here was funded by the Department of Program Development for Gifted Children, Office of the Superintendent of Public Instruction, Springfield, Illinois. The Gifted Program Evaluation, now in its fourth and final year, is administered by the Center for Instructional Research and Curriculum Evaluation (CIRCE), University of Illinois at Urbana-Champaign.

[2]GALLAGHER, J.J., and JENNE, W. Productive thinking of gifted children. Cooperative Research Project Number 965, Urbana, Illinois: Institute for Research on Exceptional Children, University of Illinois, August 1963, page 10.

[3]A copy of the CAQ may be obtained by writing to Illinois Gifted Program Evaluation, 805 West Pennsylvania Avenue, Urbana, Illinois 61801.

[4]The median student estimates show a correlation of .67 ($p < .01$) with the percentage of teacher talk recorded by observers; correlation of teacher estimates with observers is .35 ($p > .05$).

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ED047325

PATTERNS OF COGNITIVE AND AFFECTIVE EMPHASIS IN GIFTED AND AVERAGE CLASSES

By

Ernest R. House
Joe Milan Steele
Stephen D. Lapan
Thomas Kerins

Illinois Gifted Program Evaluation
Center for Instructional Research and Curriculum Evaluation
University of Illinois
805 West Pennsylvania
Urbana, Illinois 61801

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A paper for presentation to the

American Educational Research Association

New York, New York

February 7, 1971

CG 006 188

PATTERNS OF COGNITIVE AND AFFECTIVE EMPHASIS IN GIFTED AND AVERAGE CLASSES

As part of a large-scale evaluation of the state gifted program in Illinois, the systematic processing of low-inference student judgments about their classes was used to describe and evaluate classroom transactions. The purpose of this study was to determine 1) What cognitive and affective emphases exist in the classroom, and 2) What patterns differentiate "gifted" and "average" classes?

The sample used for this study consisted of 131 Illinois classes in language arts, science, math, and social studies, grades 6 to 12; 3138 students completed the CAQ. One group of 62 classes were "gifted" classes as identified by their school district. This sample was further divided into 28 "reimbursement" classes (in districts receiving money from the state to operate a gifted program) and 34 "demonstration" classes (in districts selected by the state to demonstrate exemplary gifted programs). A group of 69 "average" classes was taken as a comparison group with care not to include any below average classes. A separate study had shown that gifted and average students do not respond differently to the CAQ (see Hession paper). The average sample was drawn from three Chicago suburban districts -- mainly white, middle-class, socio-economically average -- and does not purport to be representative of all classes in the state. An analysis of variance revealed no differences between the average schools in CAQ scores.

Comparisons Between Gifted and Average Classes

How do gifted classes in Demonstration Centers and Reimbursement Projects differ from average classes (classes not designated as honors or gifted)? To determine whether differences exist, these three groups of classes were compared on summary subscores based on the four major dimensions of the CAQ:

1) Lower Thought Processes

2) Higher Thought Processes

3) Classroom Focus

4) Classroom Climate

Table 1 shows the differences revealed by this comparison. (Tables 2 and 3 give the ANOVA and t-test values on which these results are based.) Both Reimbursement and Demonstration gifted classes place significantly more emphasis on higher thought processes, classroom focus, and classroom climate. The degree of emphasis given by average classes on these three dimensions is very low. The two groups of gifted classes differed only in the degree to which they emphasized positive classroom focus -- active student involvement in class activities with reduced pressure on tests and grades. Demonstration classes had significantly more positive conditions in this dimension than either Reimbursement or Average classes. In fact the degree of positive emphasis in the latter two is low, with the trend in Average classes being toward a negative classroom focus -- the teacher lecturing and being the central figure with little student discussion and much test/grade pressure.

It is clear from Table 1 that average classes as a group place little emphasis on any of the four dimensions of instructional climate measured by the CAQ. In contrast both groups of gifted classes differ strikingly

TABLE 1

DIFFERENCES IN INSTRUCTIONAL CLIMATE IN GIFTED AND NON-GIFTED CLASSROOMS IN ILLINOIS

(Tests of significance of differences are based on Analysis of Variance and t-tests. All but one of the significant differences exceed the .01 level of confidence. See Table 2 for F tests and Table 3 for t-tests).

Dimensions of the Class Activities Questionnaire	Comparison Sample of Average Classrooms N = 69	Reimbursement Sample of Gifted Classrooms N = 28	Demonstration Sample of Gifted Classrooms N = 34
LOWER LEVEL THINKING ABILITIES	2.238* Some emphasis	2.170 Some emphasis	2.169 Some emphasis
HIGHER LEVEL THINKING ABILITIES	2.352 No emphasis	2.069 Some emphasis (Significantly greater than Comparison Group)	2.025 Some emphasis (Significantly greater than Comparison Group)
POSITIVE CLASSROOM FOCUS	2.612 No emphasis	2.304 No emphasis (Significantly greater than Comparison Group)	2.127 Some emphasis (Significantly greater than both the Comparison and Reimbursement Groups
POSITIVE CLASSROOM CLIMATE	2.319 No emphasis	1.941 Much emphasis (Significantly greater than the Comparison Group)	1.919 Much emphasis (Significantly greater than Comparison Group)

*The value shown in each cell is the mean score for the group. A mean under 2.25 indicates some emphasis and under 2.00 much emphasis on the dimension concerned.

**Both Reimbursement and Demonstration classes show almost equal emphasis on both higher and lower level thinking abilities, while Comparison classes show less emphasis on lower thinking abilities and no emphasis on higher levels.

TABLE 2

ANALYSES OF VARIANCE FOR FOUR DIMENSIONS

Lower Thought Processes Subscore

Source	df	SS	MS	F ratio
Between	2	.14	.07	2.44*
Within	128	3.66	.03	
Total	130	3.80		

*p > .05 (Not Significant)

Higher Thought Processes Subscore

Source	df	SS	MS	F ratio
Between	2	2.68	1.34	40.29**
Within	128	4.26	.03	
Total	130	6.95		

**p < .001

Classroom Focus Subscore

Source	df	SS	MS	F ratio
Between	2	6.03	3.02	37.52**
Within	128	10.29	.08	
Total	130	16.32		

**p < .001

Classroom Climate Subscore

Source	df	SS	MS	F ratio
Between	2	4.40	2.20	31.64**
Within	128	8.90	.07	
Total	130	13.30		

**p < .001

TABLE 3

VALUES OF STUDENT'S t COMPARING DIFFERENCES BETWEEN MEANS FOR THE AVERAGE AND GIFTED SAMPLES ON EACH OF THE FOUR CAQ SUBSCORES

Comparisons	df	Mean	SD	Difference Between Means	t
SUBSCORE 1: LOWER THOUGHT PROCESSES					
Average & Reimbursement	95	2.223	.177	.053	1.384
Average & Demonstration	101	2.214	.157	.073	2.019*
Reimbursement & Demonstration	60	2.174	.163	.020	.482
SUBSCORE 2: HIGHER THOUGHT PROCESSES					
Average & Reimbursement	95	2.276	.188	.264	6.643***
Average & Demonstration	101	2.252	.145	.303	7.570***
Reimbursement & Demonstration	60	2.067	.197	.040	.885
SUBSCORE 3: CLASSROOM FOCUS					
Average & Reimbursement	95	2.524	.265	.304	4.593***
Average & Demonstration	101	2.449	.365	.495	9.186***
Reimbursement & Demonstration	60	2.203	.242	.190	2.454**
SUBSCORE 4: CLASSROOM CLIMATE					
Average & Reimbursement	95	2.212	.273	.370	6.054***
Average & Demonstration	101	2.198	.273	.365	6.662***
Reimbursement & Demonstration	60	1.952	.236	.006	.085

*$p < .05$, however ANOVA for Subscore 1 was not significant.

**$p < .02$

***$p < .001$

from the Average classes sampled here. Gifted classes emphasize most or all of the four dimensions measured.

Within the gifted groups demonstration classes are superior to reimbursement classes in only one dimension -- classroom focus. This dimension has been most emphasized in the selection and training of demonstration personnel. That is, classroom focus has been away from the teacher lecturing and being the central figure with little student discussion and much test/grade stress. Also worth mention is the fact that of the four dimensions classroom focus is the easiest to make visible to classroom visitors.

An analysis of variance was also run on the statistical factors with the same results. The three groups are significantly different at the .01 level on Factor I (Application, Synthesis, Enthusiasm, and Independence) and Factor II (Memory and Test/Grade Stress). The gifted classes are superior to the average classes on both factors but there is no difference between the demonstration and reimbursement classes.

Are there patterns of emphasis within these four dimensions which characterize each sample of classes? The ensuing sections will look specifically at the sixteen factors within the four dimensions of the CAQ.

Patterns of Cognitive Emphasis

The first two dimensions of the CAQ, Lower and Higher Thought Processes, are composed of seven hierarchical levels of thinking based on Bloom's Taxonomy. Each higher numbered level includes the lower levels as part of the thinking operation. Thus all of the Higher Thought Processes (Application, Analysis, Synthesis, and Evaluation) utilize the Lower Thought Processes (Memory, Translation, Interpretation) in performing the thinking operation. The highest level, Evaluation, theoretically could call into

play all of the other six levels as subordinate processes in the act of evaluating. By way of illustration, if a student is expected to know a classification system for rock and mineral identification, memori..ing is the end implied by the activity. However, if a student is given a bag full of rocks and minerals and is expected to identify them using the classification system, application is the end sought. Here memory or recall of the classification system serves as a means for efficiently identifying the rocks, but not as an end in itself.

What activities predominate in classrooms? In what percent of average classes or gifted classes are activities emphasized which call for each of the thinking processes? The CAQ provides only an indication -- a rough estimate -- of the focus of emphasis, but it is informative.[1]

Table 4 shows the patterns of emphasis which characterize each of the three groups of classes. Only those factors which were seen as emphasized (to any degree) by at least 25% of the classes in a group are considered to characterize a group. (Emphasis by fewer than 25% of the classes is not shown).

Average classes as a group emphasize three of the seven thought processes. The most common focus of emphasis is on Analysis -- breaking things apart into their structural components. (Remember that a particular class might have emphasized one of these levels, or two or three, or none. It might -- unlike the group as a whole -- have emphasized one or more of the other four levels, too.) It should be obvious from this pro-

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[1]Bear in mind that the lowest level, Memory, as noted by Steele , is not adequately assessed by the CAQ. Activities requiring rote memory rather than those calling for recall or recognition seems to be assessed. Drill and repetitive exercises are activities not fully reflected in the factor as presently structured.

TABLE 4

CHARACTERISTIC PATTERNS OF COGNITIVE EMPHASIS IN AVERAGE AND GIFTED CLASSES

	Cognitive Levels	% of Classes in Each Group Emphasizing Each Level: Sample of Average Classes (N=69)	Sample of Gifted Reimbursement Classes (N=28)	Sample of Gifted Demonstration Classes (N=34)
LOWER THOUGHT PROCESSES	1. Memory	--	--	--
	2. Translation	39%	57%	47%
	3. Interpretation	30%	64%	82%
HIGHER THOUGHT PROCESSES	4. Application	--	43%	59%
	5. Analysis	58%	90%	74%
	6. Synthesis	--	43%	39%
	7. Evaluation	--	25%	35%

file that many average classes place little or no emphasis on any cognitive level.

Both Reimbursement and Demonstration Gifted Classes are seen as emphasizing six of the seven cognitive levels -- twice as many as the Average classes. A greater proportion of classes emphasize each level in the Gifted group. In fact, a majority of the gifted classes emphasize three of the seven levels. The pattern of emphasis differs slightly between the Reimbursement and Demonstration groups. There is a shift upward in Demonstration classes toward greater emphasis on higher thought processes. A majority of Reimbursement classes emphasize levels 2, 3, and 5 (Translation, Interpretation and Analysis). A majority of the Demonstration classes emphasize levels 3, 4, and 5 (Interpretation, Application, and Analysis).

Varieties of Cognitive Emphasis

The characteristic patterns of emphasis in Average and Gifted classes indicate that as a group a greater proportion of Gifted classes emphasize a wider variety of cognitive levels than the Average group of classes. But what variety of emphasis occurs in individual classes? Are several levels of thinking emphasized in the same classroom? It would seem appropriate for gifted classes to emphasize a greater variety of thought processes than average classes, as well as emphasizing several of the higher levels of thinking. Table 5 shows the number (not the level) of thought processes emphasized in classrooms in each group.

TABLE 5

TOTAL NUMBER OF THOUGHT PROCESSES EMPHASIZED IN AVERAGE AND GIFTED CLASSROOMS

	% of Classes Emphasizing Each Number of Thought Processes		
Number of Thought Processes Emphasized By Individual Classes	Sample of Average Classes (N=69)	Sample of Gifted Reimbursement Classes (N=28)	Sample of Gifted Demonstration Classes (N=34)
None Emphasized	13%	--	--
1*	35%	11%	9%
2	25%	21%	21%
3	19%	25%	23%
4	7%	21%	26%
5	1%	18%	12%
6	--	4%	9%
7	--	--	--

*These numbers do not correspond to the levels of thinking, but only reflect how many thought processes are emphasized by individual classes.

The table shows that while only 8% of the Average classes emphasize four or more thought processes, 43% of the Gifted Reimbursement classes and 47% of the Gifted Demonstration classes emphasize four to six processes. The converse is also true: 48% of the Average classes emphasize one or no thought processes while only 9% and 11% of the two Gifted groups of classes emphasize as few as one or no levels of thinking.

Table 6 shows the number of Higher Thought Processes emphasized in Average and Gifted classes.

TABLE 6

NUMBER OF HIGHER THOUGHT PROCESSES EMPHASIZED IN AVERAGE AND GIFTED SAMPLES

Number of Higher Thought Processes Emphasized By Individual Classes	Sample of Average Classes (N=69)	Sample of Gifted Reimbursement Classes (N=28)	Sample of Gifted Demonstration Classes (N=34)
None Emphasized	28%	4%	6%
1	54%	29%	26%
2	16%	39%	32%
3	1%	21%	21%
4	1%	7%	15%

It can be seen that while only 18% of the Average classes emphasized more than one Higher Thought Process, 67-68% of the two Gifted groups emphasized more than one.

Thus it is clear that individual Gifted classes emphasize many levels of thinking including several higher thought processes. While this variety of emphasis would seem a beneficial instructional climate in any classroom, it seems especially appropriate for the gifted.

Patterns of Emphasis on Noncognitive Classroom Conditions

The third and fourth dimensions of the CAQ are Classroom Focus and Classroom Climate. Classroom Focus is concerned with the center of attention and activity -- on the teacher or the students. Classroom Climate is concerned with the openness of the classroom -- the existence of opportunities and conditions which are motivating and conducive to learning.

Table 7 shows the pattern of emphasis which characterize each of the three groups of classes. Again, only those factors which were seen as emphasized by at least 25% of the classes in a group are shown.

TABLE 7

CHARACTERISTIC PATTERNS OF EMPHASIS ON CLASSROOM FOCUS AND CLIMATE IN AVERAGE AND GIFTED CLASSES

	Classroom Conditions (Factors from the Class Activities Questionnaire)	% of Classes in Each Group Emphasizing Each Factor		
		Sample of Average Classes (N=69)	Sample of Gifted Reimbursement Classes (N=28)	Sample of Gifted Demonstration Classes (N=34)
CLASSROOM FOCUS	8. Discussion	30%	89%	88%
	9. Test/Grade Stress	25%	--	--
	10. Lecture	28%	32%	--
CLASSROOM CLIMATE	11. Enthusiasm	--	65%	70%
	(Lack of)	(51%)	(--)	(--)
	12. Independence	28%	71%	79%
	13. Divergence	69%	96%	97%
	(Much Emphasis)	(--)	(71%)	(82%)
	14. Presence of Humor	78%	93%	85%

In the Average Sample about as many classes (one-fourth of the group) seem to emphasize Lecture as emphasize Discussion. As the next table which deals with amount of teacher talk will show, however, the opportunity for discussion is limited due to the amount of teacher talk which occurs. The classroom focus in Average classes seems clearly on the teacher as information-giver, with a limited amount of active involvement of students. As a group Average classes are also characterized by stress on tests and grades.

In the Classroom Climate dimension, the most striking characteristic of Average classes is the lack of enthusiasm. In less than 25% of the classes are students excited and involved. On the contrary, in over half the Average classes students are not just neutral but negative and uninterested in class activities. As a group Average classes permit some opportunity for independence and divergence, however a very high degree of opportunity for divergent activities is not characteristic of Average classes. The presence of humor and laughter is characteristic of all three groups of classes studied.

In contrast to the Average group, almost all classes in the two Gifted groups emphasize discussion. Gifted students have opportunity and are involved in discussion. An emphasis on tests and grades is not characteristic of gifted classes. For the Reimbursement Gifted classes, lecture is still a characteristic of Classroom Focus in addition to the strong emphasis on discussion.

Both groups of Gifted classes are characterized by an extremely positive Classroom Climate. In a majority of the gifted classes students are excited and involved in class activities. There is opportunity for independent activities and <u>much</u> opportunity for divergent activities. As was true in the Cognitive dimensions a greater <u>proportion</u> of the classes in the Gifted groups emphasized positive classroom focus and classroom climate than Average classes.

Teacher Talk

The percentage of class time consumed by the teacher speaking is in itself an index of classroom conditions. The more teacher talk, the more passive a role of the student has in class activities. As was pointed out in an earlier section, students are extremely accurate in making this estimate. Table 8 shows the range of teacher talk in Average and Gifted classes. Note the extremes of High and Low amounts of talk.

The mode in Average classes is teacher talk 75% of class time; it is 60% in the two Gifted groups. However, the teacher talks less than half the time in 1/9 (12%) of the Average classes, 1/5 (21%) of the Gifted Reimbursement classes, and 1/3 (35%) of the Gifted Demonstration classes.

TABLE 8

PERCENTAGE OF CLASSES WITH HIGH TO LOW AMOUNTS OF TEACHER TALK

(Based on the median student estimate of teacher talk per class.)

Teacher Talk During Class Time	Percentage of Classes in Each Group		
	Average	Reimbursement	Demonstration
High (75-90% teacher talk)	55%	43%	6%
60%	33%	36%	59%
40%	9%	7%	14%
Low (10-25% teacher talk)	3%	14%	21%
	100%	100%	100%
	(N=69)	(N=28)	(N=34)

There is a dramatic decrease in teacher talk from Average to Gifted Demonstration classes. The percentage of classes in which an extremely low amount of teacher talk prevails increases sharply from Average to Demonstration classes.

Preparation for Class

Students estimated the amount of time each week they spent preparing for class. Bear in mind that their estimate concerns only one of five to seven or more subjects for which homework could be expected. Some of the preparation might be voluntary instead of required work. Table 9 shows the amount of time spent preparing for class weekly for Average and Gifted classes.

TABLE 9

TIME SPENT PREPARING FOR CLASS EACH WEEK IN AVERAGE AND GIFTED CLASSES

(Based on the median student estimate for each class.)

Hours of Preparation Time Each Week	Sample of Average Classes (N-69)	Sample of Gifted Reimbursement Classes (N=28)	Sample of Gifted Demonstration Classes (N=34)
Less than 1 hour	10%	0%	35%
From 1 to 2 hours	67%	43%	44%
More than 2 hours	23%	57%	21%

It can be noted in the Table that students in a large proportion of classes in all three groups spend from 1 to 2 hours per week on homework of some kind. This is somewhat less than one-half hour each evening. The two Gifted groups show some variation from this pattern, but in opposite directions. The majority of students in Gifted Reimbursement classes spend more than 2 hours a week preparing for class. Gifted Demonstration students in over one-third of the classes spend less than one hour per week on outside preparation. It is difficult to account for this difference without information on the nature of outside-of-class activities.

Summary

Based on the Class Activities Questionnaire, significant differences are found between Average and Gifted Illinois classes in the degree of emphasis on higher thought processes, classroom focus, and classroom climate. Significant differences are also noted between Average and Gifted classes on the statistical factors of "Application, Synthesis, Enthusiasm, and Independence" and "Memory and Test/Grade Stress."

Specifically the following differences are noted:

Average Classes	Gifted Classes
1. Most classes emphasize few (2 or less) thought processes.	1. Most classes emphasize many (3 or more) thought processes.
2. Most classes emphasize only one (if any) of the higher thought processes.	2. Most classes emphasize two or more of the higher thought processes.
3. As a group, Average classes emphasize 3 of the 7 levels of thinking: Translation, Interpretation, Analysis.	3. As a group, Gifted classes emphasize 6 of the 7 levels of thinking.
4. A higher amount of teacher talk occurs.	4. A moderate amount of teacher talk occurs.
5. Classes have little opportunity for or involvement in discussion.	5. Classes have much opportunity for and involvement in discussion.
6. Test/grade stress is characteristic of Average classes as a group.	6. Test/grade stress is not characteristic of Gifted classes as a group.
7. There is an absence of enthusiasm in a majority of the classes.	7. The presence of enthusiasm characterizes almost all classes.
8. There is opportunity for independence in a fourth of the classes.	8. There is opportunity for independence in most Gifted classes.